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(57) **ABSTRACT**

A valve wrench and method to rotate a valve. The valve wrench includes a handle extension, an insert configured to adjustably receive the handle extension, a sleeve configured to adjustably receive the insert, and a locking mechanism configured to interlock the insert relative to the sleeve.

**16 Claims, 3 Drawing Sheets**

*B25B 13/18* (2006.01)

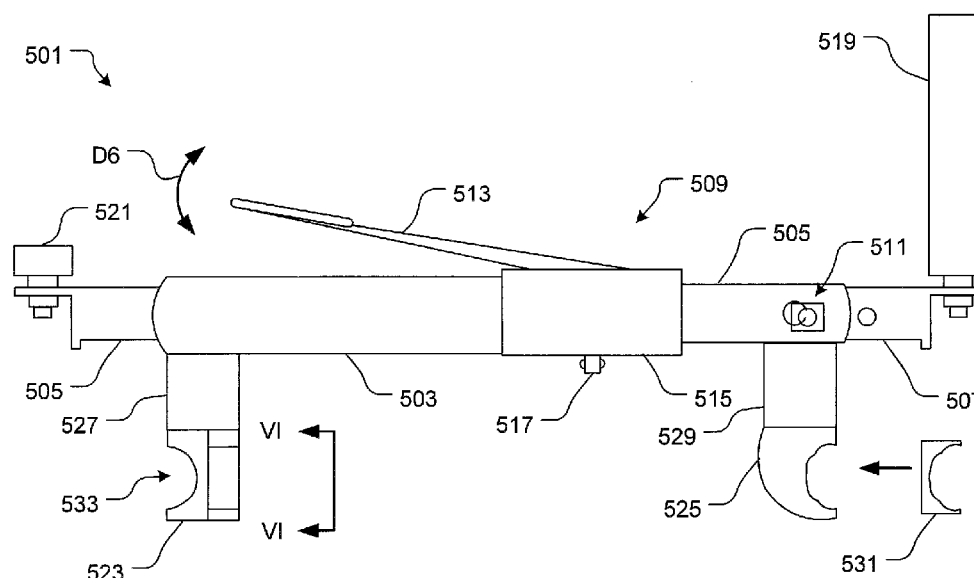
*B25B 13/20* (2006.01)

CPC ..... **F16K 31/60** (2013.01); **F16K 31/46**  
(2013.01); **B25B 13/14** (2013.01); **B25B 13/18**  
(2013.01); **B25B 13/20** (2013.01)

CPC ..... B25B 13/12; B25B 13/14; B25B 13/18;  
B25B 13/20; B25B 13/22; B25B 13/24;  
B25B 13/48; B25B 13/56; F16K 31/46;  
F16K 31/60

USPC ..... 251/291–293; 81/119, 124.2, 124.5,  
81/176.15, 176.3, 186; 294/100, 119.1,  
294/902

See application file for complete search history.



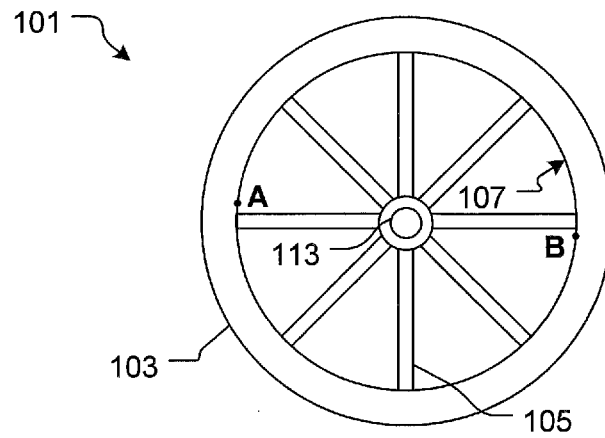


FIG. 1  
(Prior Art)

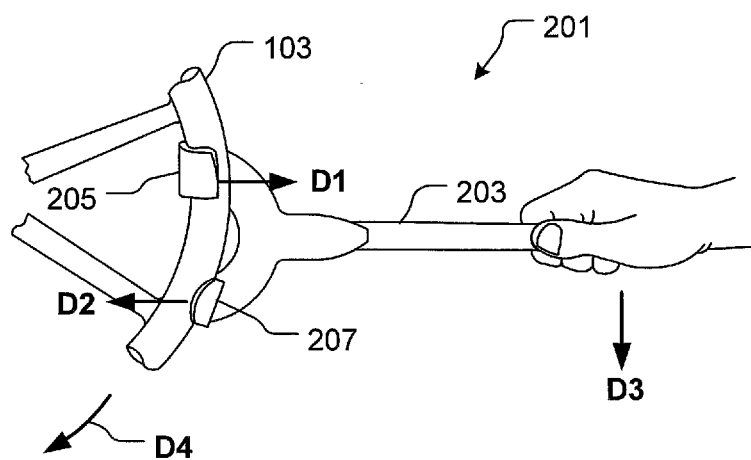


FIG. 2  
(Prior Art)

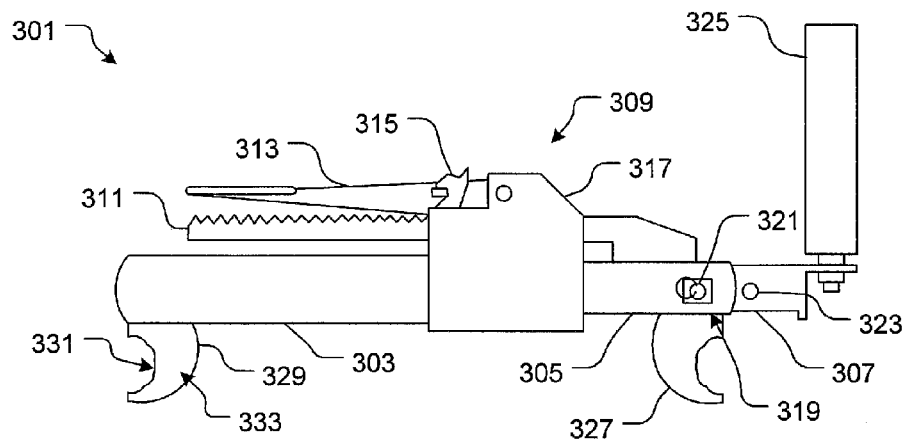


FIG. 3

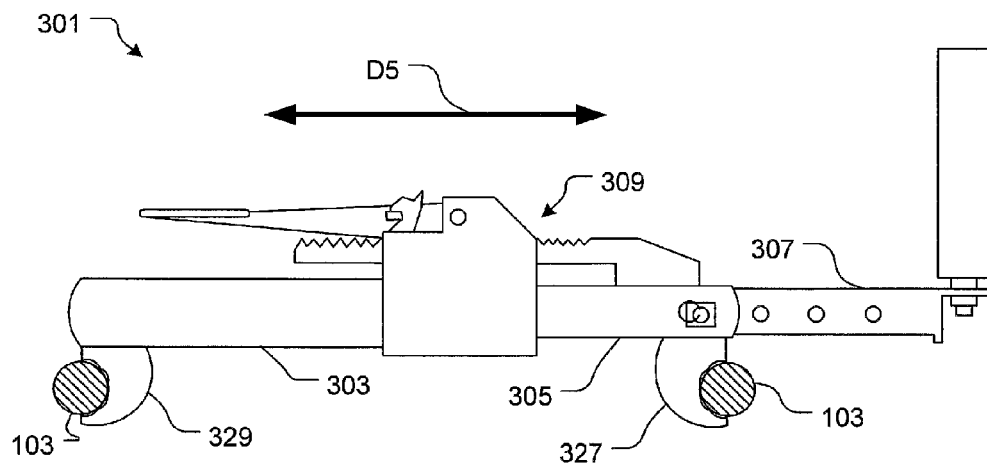


FIG. 4

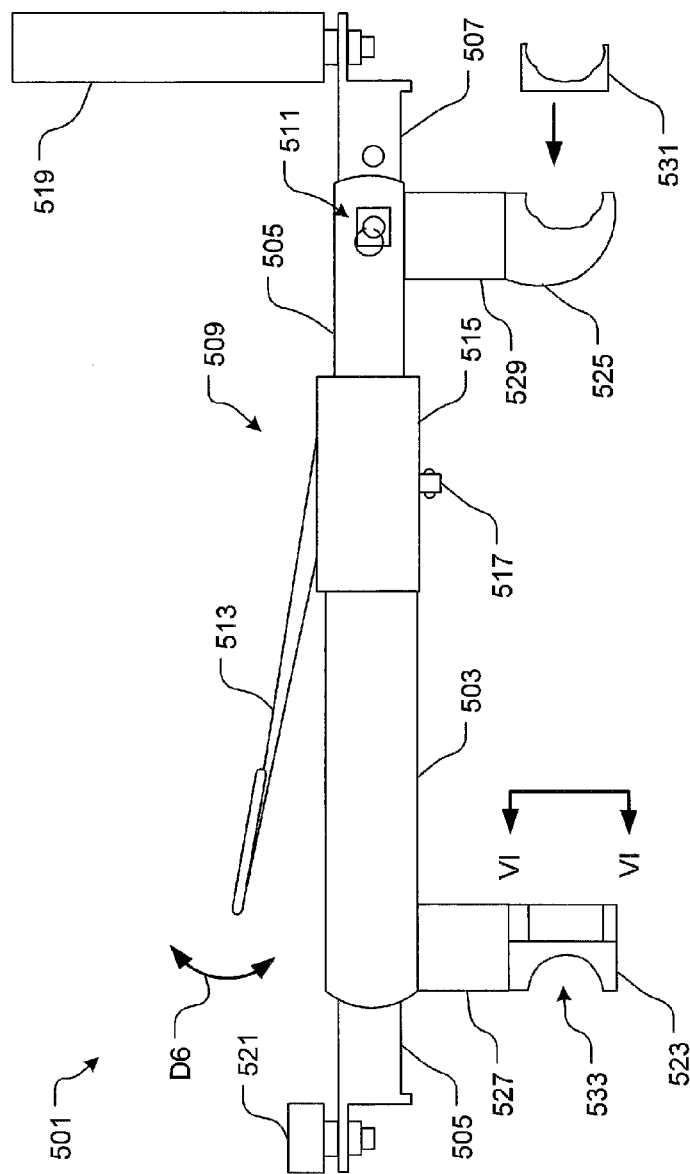


FIG. 5

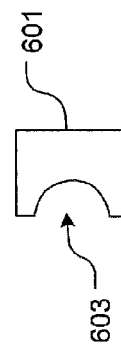


FIG. 6

## ADJUSTABLE VALVE WRENCH

## BACKGROUND

## 1. Field of the Invention

The present application relates generally to handles, and more specifically, to an adjustable valve wrenches.

## 2. Description of Related Art

Valve wrenches are well known in the art for effectively attaching to and rotating the rims of valves associated with valves and the like. Conventional valve wrenches typically include a gripping handle associated with one or more attachment means configured to grip the rim of the valve. After secured to the rim, force is applied to the valve wrench, which in turn rotates that valve. This feature provides significant advantages, namely, the valve wrench is configured to provide additional rotational leverage, thereby creating sufficient torque moment to rotate the valve.

U.S. Pat. No. 2,539,262 to Moore is one known embodiment indicative of a current state-of-the-art valve wrench. In FIG. 1, a front view of a valve **101** is shown having a rim **103** and a plurality of spokes **105**. In FIG. 2, a side view of the Moore tool **201** is shown with valve **101**. The Moore tool **201** comprises of a handle **203** that bifurcates into two grips **205** and **207**. The two grips are configured to partially wrap around rim **103** in opposing directions and apply horizontal forces **D1** and **D2** as a downward force **D3** is created by the user, resulting in the valve rotating in direction **D4**.

It should be noted that the Moore tool is configured to utilize solely the rim and not the spokes during the rotation process. Further, it should be noted that the Moore tool, along with other tools commonly known in the art, is not configured to utilize opposing ends of the rim, e.g., at positions A and B, to rotate valve **101**. This feature greatly reduces the amount of force applied to the valve.

Although the foregoing developments in handles for valves represent great strides, many shortcomings remain.

## DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the embodiments of the present application are set forth in the appended claims. However, the embodiments themselves, as well as a preferred mode of use, and further objectives and advantages thereof, will best be understood by reference to the following detailed description when read in conjunction with the accompanying drawings, wherein:

FIG. 1 is a front view of a conventional valve;

FIG. 2 is a conventional valve turning tool;

FIGS. 3 and 4 are side views of an adjustable valve wrench according to a preferred embodiment of the present application; and

FIGS. 5 and 6 are side views of an alternative embodiment of the adjustable valve wrench of FIG. 3.

While the apparatus and method of the present application is susceptible to various modifications and alternative forms, specific embodiments thereof have been shown by way of example in the drawings and are herein described in detail. It should be understood, however, that the description herein of specific embodiments is not intended to limit the invention to the particular embodiment disclosed, but on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the process of the present application as defined by the appended claims.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Illustrative embodiments of the apparatus and method are provided below. It will of course be appreciated that in the

development of any actual embodiment, numerous implementation-specific decisions will be made to achieve the developer's specific goals, such as compliance with apparatus-related and business-related constraints, which will vary from one implementation to another. Moreover, it will be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking for those of ordinary skill in the art having the benefit of this disclosure.

The valve wrench of the present application overcomes the above-listed problems commonly associated with conventional valve wrenches and the like. Specifically, the valve wrench is adjustable, which enables the valve wrench to be utilized on valves having various diameters. Further, the valve wrench utilizes opposing sides of the rim, e.g., positions A and B of rim **103**, along with the option of utilizing the spokes to rotate the valve. These features, along with the other features discussed herein, provide significant advantages over conventional valve wrench tools. Further detailed description of these features are provided below and illustrated in the accompanying drawings.

The apparatus and method of the present application will be understood, both as to its structure and operation, from the accompanying drawings, taken in conjunction with the accompanying description. Several embodiments of the apparatus are presented herein. It should be understood that various components, parts, and features of the different embodiments may be combined together and/or interchanged with one another, all of which are within the scope of the present application, even though not all variations and particular embodiments are shown in the drawings. It should also be understood that the mixing and matching of features, elements, and/or functions between various embodiments is expressly contemplated herein so that one of ordinary skill in the art would appreciate from this disclosure that the features, elements, and/or functions of one embodiment may be incorporated into another embodiment as appropriate, unless described otherwise.

Referring now to the drawings wherein like reference characters identify corresponding or similar elements throughout the several views, FIGS. 3 and 4 depict side views of handle **301** in accordance with a preferred embodiment of the present application. Although shown associated with a valve **101** configuration, handle **301** could also be utilized with different types of valves and valves having different shapes and sizes, for example, valves that have various rim diameters.

Valve wrench **301** preferably includes one or more of a sleeve **303** that receives an insert **305**, which in turn receives a handle extension **307**. As depicted in FIG. 4, the sleeve, insert, and extension are adjustable relative to each other, as depicted with arrow **D5**. Thus, the extension/retraction of these members allows the valve wrench to accommodate valve rims having various diameters. In the contemplated embodiment, sleeve **303**, insert **305**, and extension **307** have cylindrical shapes and are configured to slidably engage within each other.

Valve wrench **301** is further provided with a locking mechanism **309** configured to lock insert **305** in a fixed position relative to sleeve **303**. In the contemplated embodiment, locking mechanism **309** is a ratchet-type mechanism having a cantilevered member **311** with a plurality of locking teeth, a lever **313**, and a lock **315**. During use, insert **305** is extended/retracted in direction **D5** within sleeve **303**, which in turn moves member **311** within housing **317**. The teeth associated with member **311** interlock with a locking mechanism (not

shown) disposed within housing **317** until a desired extension is made. Thereafter, lever **313** is utilized to secure the position by application of a force **D6**.

It will be appreciated that the ratchet-type mechanism contemplated in the preferred embodiment is one of many different types of means for locking the insert relative to the sleeve. Other embodiments could utilize a cam-style mechanism that simply incorporates a pivot lever that interlocks the two members together. One advantage of the ratchet-type locking mechanism is the ability to apply significant forces in direction **D5**, which in turn provides for a tight grip against the inner surfaces **107** of valve **101** (see FIG. **1**).

Insert **305** also utilizes a pin lock **319** to secure extension **307** in a fixed position within insert **305**. Pin lock **319** incorporates a pin **321** that extends through the insert and through a hole **323** extending through extension **307**. During use, the extension **307** is extended/retracted to a desired position relative to insert **305**, then pin **321** is passed through the insert and hole **323** to lock the extension in a desired position. Finally, a ring passes through a hole (not shown) of pin **321** for retention.

It will be appreciated that an adjustable extension **307** provides means to create a greater extension, which in turn creates a larger torque moment on valve **101**. The adjustable handle extension also allows the user to manipulate the length of handle **301** when space is limited, e.g., multiple valves are close in proximity and adjacent to each other.

A gripping handle **325** is used to manipulate valve wrench **301** and is configured to extend from extension **307**. During use, the user applies rotational force to handle **325** and rotates valve wrench **301** in direction **D4**. In the contemplated embodiment, gripping handle **325** is rotatably attached to extension **307**. It will be appreciated that alternative embodiments could utilize different devices in lieu of a handle, for example, a block that a hammer can hit against (see FIG. **5**).

One of the unique features believed characteristic of handle **301** is the feature of adjusting the distance of two clamps **327** and **329** relative to each other to apply a force against the inner surface **107** of rim **103**. To achieve this feature, clamp **327** is either integral or rigidly attached to an outer surface of insert **305**, while clamp **329** is either integral or rigidly attached to an outer surface of sleeve **303**. As discussed, the sleeve and insert are adjustable to each other, which in turn enables the clamps to be adjustably positioned relative to each other in a fixed position.

When attached, clamps **327** and **329** are configured to grip the inner surface of the rim, for example, at positions A and B (see FIG. **1**). Clamp **329** is shown having a gripping surface **331** configured to grip rims having various sizes. Clamp **329** also includes a surface **333** that is preferably utilized to apply a force against the spoke **105**. Thus, in the contemplated embodiment, handle **301** applies a force against both the rim and spoke of the valve via the clamps. It will be appreciated that the features of clamp **329** are also shared with clamp **327**, thereby allowing handle **301** to apply rotational force against valve **101** at two opposing positions on rim **103** and simultaneously against two spokes **105**.

Referring next to FIGS. **5** and **6** in the drawings, an alternative embodiment of handle **301** is depicted. Handle **501** is substantially similar in form and function to handle **301**, and it will be appreciated that the features discussed herein with respect to the two embodiments could be interchangeably shared.

Like valve wrench **301**, valve wrench **501** preferably comprises one or more of a sleeve **503** that interlocks with an insert **505**. In this embodiment, extension **507** passes through the entire length of insert **505**, which in turn allows the user to

manipulate valve wrench **301** with two hands. A locking mechanism **509** is used to lock insert **505** within sleeve **503**, and a lock pin device **511** is used to lock the position of extension **507** relative to insert **505**. Like handle **301**, the sleeve, insert, and extension slidably engage with each other and are interlocked via a locking mechanism and a pin lock.

In the exemplary embodiment, a cam-type locking mechanism **509** is utilized to secure the insert relative within the sleeve. A lever **513** is used to lock the insert in a fixed position; the rotational movement of the lever being shown as arrow **D6**. During use, the lever pivots about a pivot point within housing **515** and applies pressure against the outer surface of insert **505**, which in turn prevents transverse sliding movement of the insert relative to the sleeve.

One optional feature of handle **501** is attaching a socket attachment **517** to housing **515** and/or any other component of handle **501**. The socket attachment **517** could be a square or hex-socket attachment configured to attach with other tools.

Extension **507** provides at least two means for applying rotational movement of handle **501**. In the exemplary embodiment, a gripping handle **519** is positioned on one end of extension **507**, while a knob **521** and/or handle is positioned on the opposing end. It will be appreciated that knob provides a surface for applying force, e.g., a hammer strike, thereagainst. Other devices are also contemplated in lieu of the desired knob **521**, for example, a rotatable knob that allow quick turning access.

Handle **501** is further provided with two clamps **523** and **525** that are extended from respective sleeve **503** and insert **505** via extension members **527** and **529**. The grip extensions are configured to space the sleeve, insert, and handle extension at a position relative to the valve rim, which is advantageous in applications where valves includes members protruding from the valve center.

A protective sleeve **531** could be utilized in the contemplated embodiment for protecting the claims against wear and/or to protect the rim of the valve against damage during use.

Referring to FIG. **6**, a side view taken at VI-VI of FIG. **5** illustrates clamp **523** having a secondary clamp **601** extending relative perpendicular to the gripping surface area **533**. Clamp **601** includes a gripping surface **603** that is contoured to fit against and to apply a force against spoke **105**. Thus, the contemplated embodiment includes two gripping surfaces areas to apply force simultaneously against the inner surface of the rim and a spoke. It will be appreciated that clamp **525** could also include the features of clamps **523** and **601**.

It is apparent that an apparatus and method with significant advantages has been described and illustrated. The particular embodiments disclosed above are illustrative only, as the embodiments may be modified and practiced in different but equivalent manners apparent to those skilled in the art having the benefit of the teachings herein. It is therefore evident that the particular embodiments disclosed above may be altered or modified, and all such variations are considered within the scope and spirit of the application. Accordingly, the protection sought herein is as set forth in the description. Although the present embodiments are shown above, they are not limited to just these embodiments, but are amenable to various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. A valve wrench for attachment to a rim and a spoke of a valve, comprising:
  - a handle extension;
  - an insert having a configuration to adjustably receive the handle extension, the insert having a second clamp;

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a sleeve having a configuration to adjustably receive the insert, the sleeve having a first clamp; and  
 a locking mechanism having a configuration to interlock the insert relative to the sleeve;  
 a secondary clamp extending from the first clamp and having a gripping surface area contoured to engage with the contouring of the spoke  
 wherein the first clamp and the second clamp have a configuration to grip an inner surface of the rim and the secondary clamp having a configuration to grip the spoke;  
 wherein the insert grips a first position along the rim of the valve; and  
 wherein the sleeve grips a second position along the rim of the valve, the second position opposing the first position.  
**2.** The valve wrench of claim **1**, further comprising:  
 a pin-lock mechanism associated with the handle extension and the insert;  
 wherein the pin lock mechanism is having a configuration to lock the handle in a desired position relative to the insert.  
**3.** The valve wrench of claim **2**, the pin-lock mechanism comprising:  
 a pin having a configuration to extend through a first hole passing through a thickness of the insert and a second hole passing through a thickness of the handle extension.  
**4.** The valve wrench of claim **1**, further comprising:  
 a gripping handle attached to the handle extension.  
**5.** The valve wrench of claim **1**, wherein the handle extension slidingly engages within the insert.  
**6.** The valve wrench of claim **1**, wherein the insert slidingly engages with the sleeve.  
**7.** The valve wrench of claim **1**, wherein the locking mechanism is a ratchet.  
**8.** The valve wrench of claim **7**, the locking mechanism, comprising:  
 a cantilevered tooth member attached to the insert; and  
 a locking lever attached to the sleeve.  
**9.** A valve wrench for attachment to a rim and a spoke of a valve, comprising:

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a handle extension;  
 an insert having a configuration to adjustably receive the handle extension;  
 a clamp having a configuration to grip an inner surface of the rim;  
 a secondary clamp extending from the clamp and having a configuration to engage with the spoke of the rim;  
 a sleeve having a configuration to adjustably receive the insert, the sleeve having:  
 a clamp having a configuration to grip an inner surface of the rim; and  
 a locking mechanism having a configuration to interlock the insert relative to the sleeve;  
 wherein the insert grips a first position along the rim of the valve; and  
 wherein the sleeve grips a second position along the rim of the valve, the second position opposing the first position.  
**10.** The valve wrench of claim **9**, further comprising:  
 a pin-lock mechanism associated with the handle extension and the insert;  
 wherein the pin lock mechanism having a configuration to lock the handle in a desired position relative to the insert.  
**11.** The valve wrench of claim **10**, the pin-lock mechanism comprising:  
 a pin having a configuration to extend through a first hole passing through a thickness of the insert and a second hole passing through a thickness of the handle extension.  
**12.** The valve wrench of claim **9**, further comprising:  
 a gripping handle attached to the handle extension.  
**13.** The valve wrench of claim **9**, wherein the handle extension slidingly engages within the insert.  
**14.** The valve wrench of claim **9**, wherein the insert slidingly engages with the sleeve.  
**15.** The valve wrench of claim **9**, wherein the locking mechanism is a ratchet.  
**16.** The valve wrench of claim **15**, the locking mechanism, comprising:  
 a cantilevered tooth member attached to the insert; and  
 a locking lever attached to the sleeve.

\* \* \* \* \*